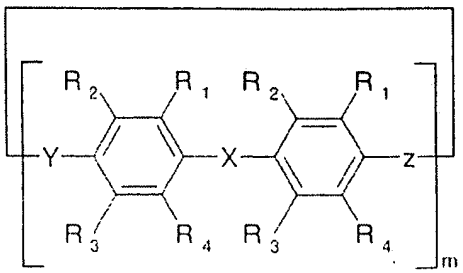
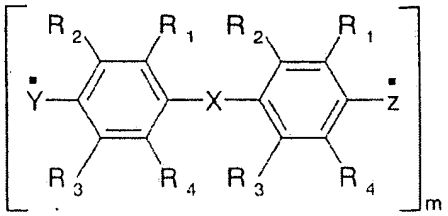
Claims

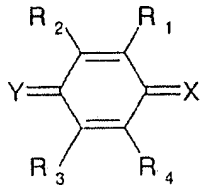
1. A method of producing bioactive surfaces on vessel endoprostheses, the articles being initially provided with a functionalized polymer layer and subsequently with another active ingredient-containing layer, characterized in that for the production of the functional polymer layer from the starting compounds of general structures (1), (2) and/or (3) at elevated temperatures and reduced pressures substantially monomers are produced in the gas phase, which are subsequently polymerized by cooling at a reduced temperature, comprising:



(1)



(2)



(3)

$R_{1,2,3,4}$: are, equal or different each, hydrogen atoms, halogen atoms, alkyl groups and/or substituted alkyl groups, aryl groups and/or substituted aryl groups, organic residues or radicals, groups of the general structure (CO(O-M-A) (wherein M: aliphatic or aromatic groups and A: e.g. hydrogen, hydroxyl, amino, carboxyl groups), metallated groups, hydroxyl groups, amino groups, carboxyl groups, ester groups, ether groups, acid halide groups, isocyanate groups, sulfur containing groups (e.g. sulfonic acid, thioether, sulfuric acid groups), nitrogen containing groups (e.g. nitrile, amide, nitro, nitrosamine groups), phosphorus containing groups (e.g. phosphoric acid ester, phosphonate groups), silicon containing groups (e.g. silyl, silyloxy groups)

X, Y: hydrocarbon residues: e.g. methylene, isopropylidene, ethylene groups, functionalized hydrocarbon residues

m: number of repeating units = 1-20,

the temperatures and/or pressures required for monomer production being between 500 and 1000°C and less 500 Pa.

2. The method according to claim 1, characterized in that dimers of structure (1) or (2), wherein n = 1, are cleaved into monomers at temperatures between 600 and 900°C and pressures of less than 100 Pa and the subsequent polymerization is carried out at temperatures of less than 120°C.

3. The method according to claim 1 or 2, characterized in that the functional polymer deposited on the vascular endoprosthesis advantageously has a layer thickness between 10 and 1000 nm, more preferably a layer thickness of 200 – 400 nm.

4. The method according to claim 1, 2 or 3, characterized in that for depositing the active ingredient layer the polymer-coated stent wet with a solution of the active ingredient(s) in a water miscible solvent, such as dimethylsulfoxide (DMSO), dioxane, dimethylformamide (DMF) or tetrahydrofuran (THF), is immersed in water, the water insoluble active ingredient precipitating and partially depositing on the surface.

5. The method according to claim 4, characterized in that the active ingredient loading and active ingredient adhesion are increased as compared to the non-coated surface by hydrophobic and electrostatic interactions with the functional groups of the functional polymer coating.

6. The method according to claim 4 or 5, characterized in that the active ingredient(s) are additionally incorporated in part into the polymer layer.

7. The method according to claim 4, 5, or 6, characterized by using water insoluble active ingredients or active ingredients poorly soluble in water, such as tretinoin and tretinoin derivatives, orphan receptor agonists, elafin derivatives, corticosteroids and steroidal hormones (such as methylprednisolone, dexamethasone, estradiole), taxol, taxol derivatives, rapamune, tacrolimus, hydrophobic proteins or cell proliferation-altering substances.

8. The method according to claims 4, 5 and 7, characterized in that the kinetics of the active ingredient release *in vivo* from the vascular endoprosthesis surface is determined by the poor solubility of the active ingredient in aqueous media.

9. The method according to claim 1, characterized in that the active ingredient-containing layer is another polymer layer produced by a directly covalent bond, or a covalent bond via a spacer system, to the functional polymer coating and subsequent loading with active ingredient.

10. The method according to claim 9, characterized in that the covalently bonded polymer is a thermosensitive polymer which at a temperature below 36°C in the active ingredient-containing medium has an open structure into which active ingredient molecules can be incorporated and at temperatures $\geq$ 36°C has a closed structure in which the active ingredient molecules are enclosed.

11. The method according to claims 9 and 10, characterized by using active ingredients such as tretinoin and tretinoin derivatives, orphan receptor agonists, elafin derivatives, corticosteroids and steroid hormones (such as methylprednisolone, dexamethasone, estradiol), taxol, taxol derivatives, rapamune, tacrolimus, hydrophobic proteins or cell proliferation-altering substances.